lead connector 235 and connector terminals include, but are not limited to, LV-1, IS-1 UNI or IS-1 BI. Other lead connectors and connector terminals are possible.

The paragraph beginning on page 9, line 3, is amended as follows:

The second lead 226 further [incudes] includes a first left ventricular electrode 236 and a second left ventricular electrode 238, where both the first and second left ventricular electrodes 236 and 238 are adapted to be positioned adjacent the left ventricle 240 via the coronary vasculature. In one embodiment, the first and second left ventricular electrodes 236 and 238 are pacing/sensing electrodes, where the first electrode 236 and the second electrode 238 are ring electrodes that either completely or partially encircles lead body 230. Alternatively, the second electrode 238 is a tip electrode positioned at the distal end 234 of the lead 226.

The paragraph beginning on page 9, line 17, is amended as follows:

The lead 226 is releasably attached to the implantable pulse generator 210, where the connector terminals couple the ventricular electrodes 236 and 238 via lead conductors to the electronic control circuitry within the implantable pulse generator 210. The control [circuity] circuitry within the implantable pulse generator 210 receives cardiac signals sensed through the use of the electrodes 236 and 238 and generates pacing pulses to be delivered through the use of the electrodes.

The paragraph beginning on page 9, line 23, is amended as follows:

Sensing and pacing with electrodes 218, 219, 220, 236 and 238 and the housing of the implantable pulse generator 210 is a programmable feature of the control [circuity] circuitry within the pulse generator 210. In one embodiment, programming the sensing and pacing vectors is accomplished through the use of a medical device programmer 239. The medical device programmer 239 is used to program specific pacing and sensing vectors that use one or both electrodes 236 and 238 in conjunction with different combinations of electrodes 218, 219, 220 and the housing of the implantable pulse generator 210.

The paragraph beginning on page 10, line 2, is amended as follows:

In one embodiment, either of the ventricular electrodes 236 or 238 is used in unipolar sensing and pacing between the electrode (236 or 238) and the housing 210. Examples of these sensing and pacing vectors are shown generally at 250. In one example, the control [circuity] circuitry of the pulse generator 210 is programmed to switch from unipolar sensing and pacing between one of the two electrodes 236 or 238 and the housing to unipolar sensing and pacing between the other electrode of 236 or 238 and the housing. In an additional embodiment, both ventricular electrodes 236 and 238 are used in unipolar sensing and pacing between the electrodes 236 and 238 and the housing 210. Alternatively, a bipolar sensing and pacing vector occurs between the two electrodes 236 and 238, where either 236 or 238 is the anode and the other electrode is the cathode.

The paragraph beginning on page 10, line 12, is amended as follows:

In one embodiment, the electrodes 236 and 238 are used in sensing and pacing between the left and right ventricles of the heart. For example, one or both of the two electrodes 236 or 238 is used to sense cardiac signals and provide pacing pulses between the electrode(s) 236 and/or 238 and the first supraventricular electrode 220. In one embodiment, this pacing sensing vector is shown generally at 252. Alternatively, one or both of the two electrodes 236 and/or 238 is used to sense cardiac signals and provide pacing pulses between the electrode(s) 236 and/or 238 and the first right ventricular electrode 218. In one embodiment, this pacing sensing vector is shown generally at 254. In addition, one or both of the two electrodes 236 and/or 238 is used to sense cardiac signals and provide pacing pulses between the electrode(s) 236 and/or 238 and the second right ventricular electrode 219. In one embodiment, this pacing sensing vector is shown generally at 255. Pacing and sensing vectors 252, 254 and 255 are referred to herein as "extended" [biopolar] bipolar pacing/sensing vector, as the pacing and sensing occurs between implanted electrodes across a larger portion of the heart than is typical with a traditional bipolar pacing/sensing vector.

The paragraph beginning on page 11, line 28, is amended as follows:

In one embodiment, an output from amp 320 is shown coupled to a right ventricular activity sensor 328 to allow for a bipolar cardiac signal to be sensed from the right ventricle 214 (Fig. 2) between the first right ventricular electrode 218 and the second right ventricular electrode 219 via switch matrix 332. In this embodiment, the extended [biopolar] bipolar cross chamber sensing is accomplished by the controller 340 configuring the switch matrix 332 such that the left ventricular activity sensor 334 receives an extended bipolar cardiac signal sensed between the second left ventricular electrode 238 and the first right ventricular electrode 218. Alternatively, the left ventricular activity sensor 334 receives the extended bipolar cardiac signal sensed between the first left ventricular electrode 236 and the first right ventricular electrode 218. The left ventricular activity sensor 334 also receives extended bipolar cardiac signal sensed between the second left ventricular electrode 238 and the first supraventricular electrode 220, in addition to an extended bipolar cardiac signal sensed between the first left ventricular electrode 236 and the first supraventricular electrode 220. In addition, the left ventricular activity sensor 334 receives the extended bipolar cardiac signal sensed between the first and second left ventricular electrodes 236 and 238 and the first right ventricular electrode 218. Alternatively, the left ventricular activity sensor 334 receives the extended bipolar cardiac signal sensed between the first and second left ventricular electrodes 236 and 238 and the second right ventricular electrode 219. Which combination of extended bipolar cardiac signals are sensed depends upon the sensing vectors programmed into the switch matrix 332 by control circuitry 300. Figure 3 also shows the output from amp 326 coupled to a left ventricular activity sensor 334 to allow for a bipolar cardiac signal to be sensed from the left ventricle 240 (Fig. 2) between the first and second left ventricular electrodes 236 and 238.

The paragraph beginning on page 12, line 23, is amended as follows:

The control circuitry 300 further includes a controller 340, where the controller 340 receives the cardiac signals from the sensing circuits 328 and 334 and analyzes the cardiac signals to determine when and if to deliver electrical energy pulses to the heart. In one embodiment, the controller 340 is a microprocessor, however, other [circuity] circuitry under the

control of software and/or firmware may be used as the controller 340.

The paragraph beginning on page 14, line 26, is amended as follows:

In one embodiment, the first and second left ventricular electrodes 408 and 412 are electrically connected in common, where pacing and sensing signals occur between combinations of the first and second left ventricular electrodes 408 and 412, in common, and the third left ventricular electrode 416. In an alternative embodiment, the first and second left ventricular electrodes 408 and 412 both have the same electrical polarity (e.g., anode or cathode), but are not electrically coupled in common. Thus, each electrode 408 and 412 is electrically isolated, but has the same electrical polarity. The control circuitry within the implantable pulse generator 420 then controls each electrode for delivering pacing signals and sensing cardiac signals to the heart. In one embodiment, this allows the control [circuity] circuitry to individually adjust the output of one or both the electrodes 408 and 412 based on the pacing threshold of the patient.

The paragraph beginning on page 21, line 4, is amended as follows:

In one embodiment, an output from amp 1020 is shown coupled to a right ventricular activity sensor 1028 to allow for a bipolar cardiac signal to be sensed from the right ventricle 214 (Fig. 2) between the first right ventricular electrode 218 and the second right ventricular electrode 219. In addition, an output from amps 1022 and 1024 is shown coupled to an extended bipolar cross chamber sensor 1030. In this embodiment, the extended [biopolar] bipolar cross chamber sensor 1030 receives an extended bipolar cardiac signal sensed between the second left ventricular electrode 238 and the first right ventricular electrode 218. Alternatively, the extended [biopolar] bipolar cross chamber sensor 1030 receives the extended bipolar cardiac signal sensed between the first left ventricular electrode 236 and the first right ventricular electrode 218. The extended bipolar cross chamber sensor 1030 also receives extended bipolar cardiac signal sensed between the second left ventricular electrode 238 and the first supraventricular electrode 220, in addition to an extended bipolar cardiac signal sensed between the first left ventricular electrode 236 and the first supraventricular electrode 220. In addition, the extended [biopolar] bipolar cross chamber sensor 1030 receives the extended bipolar cardiac signal sensed between the first

and second left ventricular electrodes 236 and 238 and the first right ventricular electrode 218. Alternatively, the extended [biopolar] bipolar cross chamber sensor 1030 receives the extended bipolar cardiac signal sensed between the first and second left ventricular electrodes 236 and 238 and the second right ventricular electrode 219. Which combination of extended bipolar cardiac signals are sensed depends upon the sensing vectors programmed into the control circuitry 1000. Figure 10 also shows an output from amp 1026 coupled to a left ventricular activity sensor 1034 to allow for a bipolar cardiac signal to be sensed from the left ventricle 240 (Fig. 2) between the first and second left ventricular electrodes 236 and 238.

The paragraph beginning on page 21, line 28, is amended as follows:

The control circuitry 1000 further includes a controller 1040, where the controller 1040 receives the cardiac signals from the sensing circuits 1028, 1030 and 1034 and analyzes the cardiac signals to determine when and if to deliver electrical energy pulses to the heart. In one embodiment, the controller 1040 is a microprocessor, however, other [circuity] circuitry under the control of software and/or firmware may be used as the controller 1040.

IN THE ABSTRACT

Please replace the Abstract with the Abstract, as amended, in the Appendix entitled "Clean Version of the Amended Abstract." The replacement Abstract is intended to reflect the specific amendments as detailed in the following marked up version.

[An apparatus and] A method for allowing cardiac signals to be sensed and pacing pulse vectors to be delivered between two or more electrodes. In one embodiment, cardiac signals are sensed and pacing pulse vectors are delivered between least one of a first left ventricular electrode and a second left ventricular electrode. Alternatively, cardiac signals are sensed and pacing pulse vectors are delivered between different combinations of the first and second left ventricular electrodes and a first supraventricular electrode. In addition, cardiac signals are sensed and pacing pulse vectors are delivered between different combinations of the first and second left ventricular electrode, the first supraventricular electrode and a conductive housing.